PROC. BIOL. SOC. WASH.
98(3), 1985, pp. 564–570

A NEW CRAYFISH OF THE GENUS *ORCONECTES* FROM THE LITTLE WABASH RIVER SYSTEM OF ILLINOIS (DECAPODA: CAMBARIDAE)

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Abstract.—*Orconectes stannardi,* new species, is endemic to the Little Wabash River system of Illinois and appears to be most closely related to *O. propinquus. Orconectes iowaensis* Fitzpatrick is relegated to the synonymy of *O. propinquus.*

During a decade-long (1972–1982) survey of the decapods of Illinois (Page, in press), an undescribed species of *Orconectes* was discovered. It appears to be restricted to the Little Wabash River system of southeastern Illinois and brings to two (with *O. illinoiensis* Brown, 1956) the number of crayfishes known to be endemic to Illinois. Earlier investigators (Rietz 1912; Brown 1955) apparently collected the new *Orconectes,* but referred it to *O. propinquus* (Girard, 1852) or to *O. indianensis* (Hay, 1896). Based on data accumulated during the recent survey of Illinois, neither *O. propinquus* nor *O. indianensis* occurs in the Little Wabash River system.

Orconectes stannardi, new species
Fig. 1

Diagnosis.—Body and eyes pigmented. Rostrum concave with margins moderately thickened, subparallel, slightly converging medially; terminating in spines; median carina extending onto long acumen. Areola 29.1–33.3 (mean = 30.2, n = 14) percent of total length of carapace, 3.6–6.7 (mean = 5.0) times as long as wide with 3 to 4 punctations across narrowest part. One large cervical spine on each side of carapace. Postorbital ridges well developed, grooved dorsolaterally and terminating in large spines. Suborbital angle weakly developed. Antennal scale broadest slightly distal to midlength, 2.3–3.0 (mean = 2.7) times as long as wide. Ischia of third pereiopods only of form I male with hooks overreaching basioischial articulation. Chela with 2 rows of tubercles along mesial margin of palm; small tufts of setae over dorsal surface; dorsal surfaces of fingers with well-defined longitudinal ridges. First pleopods of form I male symmetrical, extending to bases of second pereiopods when abdomen flexed. First pleopod of form I male with shoulder on cephalic surface at base of central projection; central projection corneous, strongly tapered to hooked tip; mesial process slightly shorter, non-corneous, tapered to rounded tip, with spur about midlength on caudal surface. Annulus ventralis immovable, subrhomboidal; cephalic half with medial trough and 2 caudally directed protuberances overhanging centrally located fossa; sinuate sinus extending from fossa to caudal edge.

Holotypic male, form I: Body somewhat depressed, abdomen narrower than thorax (12.4 and 14.3 mm). Greatest width of carapace greater than depth at caudodorsal margin of cervical groove (14.0 and 11.1 mm). Areola 5 times longer

(9.1 mm) than wide (1.8 mm) with 4 punctations across narrowest part; length of areola 31.6 percent of length of carapace. Rostrum excavated dorsally with submarginal and scattered punctations, median carina; thick margins terminating in corneous spines. Acumen terminating in upturned corneous spine reaching nearly to end of antennular peduncle. Postorbital ridge well developed, grooved dorsolaterally, terminating in prominent corneous spine. Suborbital angle poorly developed; branchiostegal spine small. Cervical spine large and corneous; hepatic area tuberculate; dorsal and branchiostegal areas of carapace punctate.

Abdomen longer than carapace (31.4 and 28.8 mm). Cephalic section of telson with one movable and one immovable spine in each caudolateral corner. Basal podomere of uropod with spine extending over mesial ramus. Lateral ramus of uropod with median and submedian ridges. Lateral ramus with moderately large movable spine submarginally at caudolateral corner. Mesial ramus of uropod with prominent median ridge terminating in premarginal spine. Dorsal margin of telson and uropods lightly setiferous.

Cephalic lobe of epistome spatulate with thickened cephalolateral margins; no cephalomedian projection. Antennal scale broadest subdistally; thickened part terminating in large corneous spine.

Mesial margin of palm of right (left is regenerated) chela with primary row of 9 tubercles and secondary row of 8 smaller tubercles on dorsal surface lateral to primary row; distoventral surface of palm with 2 large tubercles at base of dactyl; dorsal surface of palm covered with many small setal tufts. Propodus with lateral base of finger impressed dorsally, less so ventrally; dorsal and ventral surfaces with submedian ridges flanked by setiferous punctations; opposable margin with row of 6 tubercles, fourth from base largest, along proximal half of finger. Dorsal and ventral surfaces of dactyl with median longitudinal ridges flanked by setiferous punctations; opposable margin with row of 4 tubercles, first and fourth from base largest, on proximal half; mesial surface with 2 rows of tubercles on proximal half, one row on distal half. Fingers with distal tubercles small and inconspicuous, terminating in large corneous tips.

Carpus with deep oblique furrow dorsally; mesial surface with one tubercle proximally and large procurved spine near midlength. Dorsodistal surface of left merus with 3 spines (right with 2); ventral surface with 1 large spine laterally and mesial row of 7 tubercles, some corneous, decreasing in size proximally; row terminating on large corneous spine. Ischium with 1 small corneous-tipped tubercle on ventromesial margin.

Hook on ischium of third pereiopod only; hook simple, overreaching basiischial articulation and not opposed by tubercle on basis. First pleopods (see "Diagnosis" for description) barely reaching bases of second pair of pereiopods when abdomen flexed.

Allotypic female: Differing from holotype in following respects: areola constituting 30.9 percent of length of carapace (27.8 mm) and 4.3 times longer than broad. Left chela with mesial surface of palm bearing 8 tubercles in primary and 7 in secondary row (short tertiary row distally). Propodus with opposable margin bearing row of 6 tubercles, third from base largest. Dactyl with opposable margin bearing 8 tubercles, most proximal ones largest. Left merus with 2 spines dorsally; ventral surface with no spine laterally, mesial row of 8 tubercles.

Sternum between third and fourth pereiopods narrowly V-shaped. Postannular

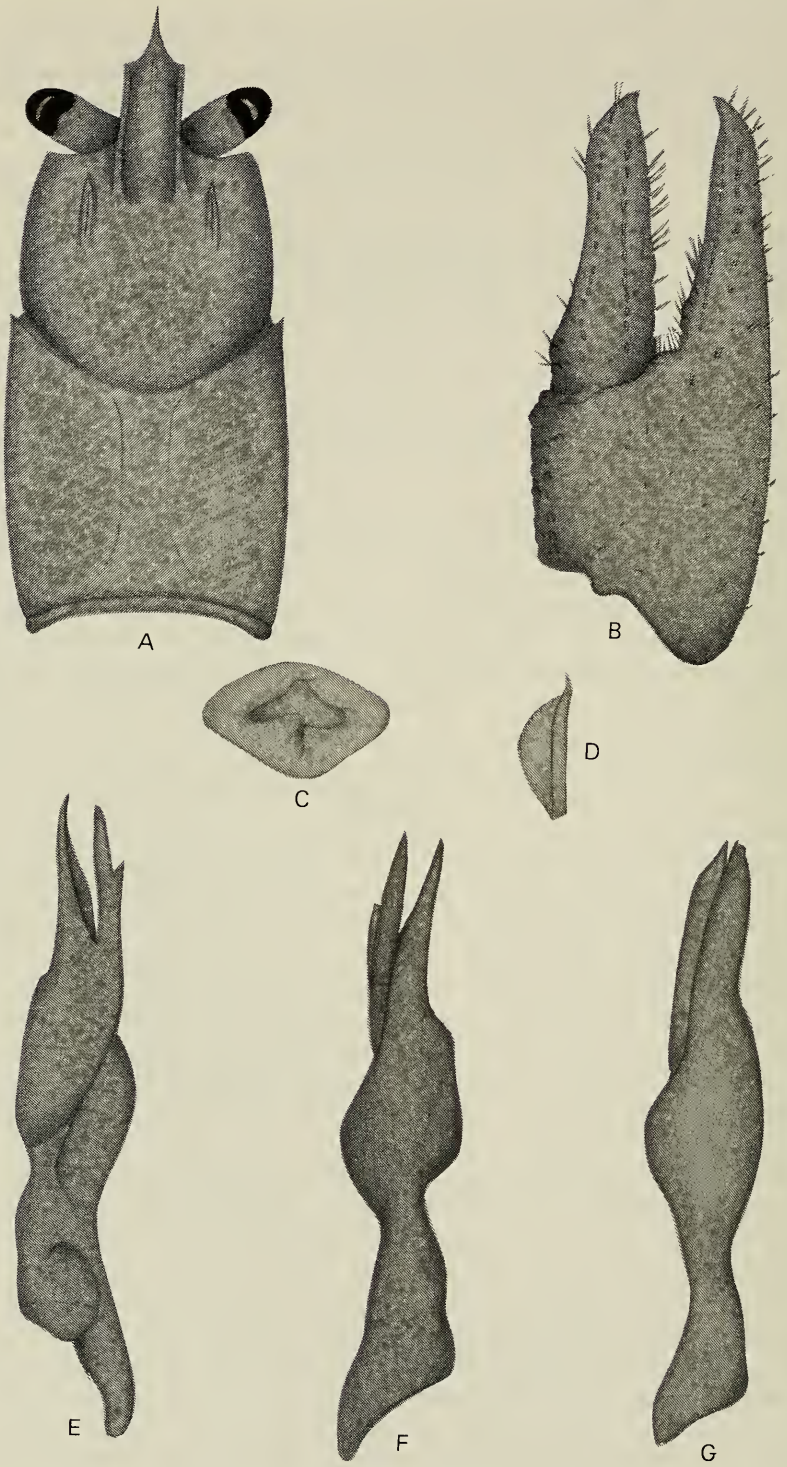

Fig. 1. *Orconectes stannardi*: a, Dorsal view of carapace; b, Dorsal view of chela; c, Annulus ventralis; d, Antennal scale; e, Mesial view of first pleopod of form I male; f, Lateral view of first pleopod of form I male; g, Lateral view of first pleopod of form II male. Drawings are composites based on type-specimens.

Table 1.—Measurements (mm) of *Orconectes stannardi.*

	Holotype	Allotype	Morphotype
Carapace:			
Entire length	28.8	27.8	32.4
Postorbital length	21.5	20.1	24.6
Width	14.0	13.1	15.1
Height	11.1	10.4	12.6
Areola:			
Width	1.8	2.0	2.1
Length	9.1	8.6	10.6
Rostrum:			
Width	3.9	3.4	4.4
Length	9.3	8.7	10.4
Chela, left (except Holotype):			
Length, palm mesial margin	7.8	5.5	5.8
Palm width	10.7	7.7	8.2
Length, lateral margin	26.9	18.2	24.5
Dactyl length	16.4	11.1	15.0
Abdomen:			
Width	12.4	13.5	12.8
Length	31.4	28.0	30.8

sclerite three-fourths as wide as annulus ventralis (described in Diagnosis). First pleopods of female uniramous, barely reaching annulus when abdomen flexed.

Morphotypic male, form II: Differing from holotype in following respects: areola constituting 32.7 percent of length of carapace (32.4 mm) and 5.0 times longer than broad. Mesial surface of palm of left chela with 6 tubercles in primary and 5 in secondary rows; propodus bearing 12 tubercles, second and fourth from base largest, on opposable margin. Dactyl with opposable margin bearing 12 tubercles, second and third from base largest. Merus with one spine dorsally, no spine ventrally, and mesial row of 5 tubercles.

Hook on ischium of third pereiopod much reduced, not overreaching basiischial articulation. First pleopod of uniform texture; both terminal elements straight, noncorneous. Spur of mesial process undeveloped, represented by small acute bulge.

Size.—The largest specimen examined is a 32.5 mm-CL form II male. The largest female is 31.9 mm. Form I males (n = 21) range from 15.8 to 28.9 mm CL.

Color.—Cephalothorax and abdomen olive-green to light brown and heavily speckled with dark brown dorsally, white ventrally. Side of carapace light green, subtended by darker green stripe. Caudal edge of carapace and first abdominal tergum crossed by dark brown band. Posterior edge of each abdominal tergum with thin red line. Chelae light brown with numerous dark brown specks; each finger with red tip and subdistal black band.

Type-locality.—Little Wabash River at Secondary Road 719, 6 km NNW Louisville (T5N, R6E, Sec. 33 SW), Clay County, Illinois. Immediately east of the river and secondary road junction is a large northward bend in the river coming within 10 m of the road; the type-specimens were collected from the east (downstream)

side of the bend in a large slab riffle. At normal level the river bed at the riffle is about 5 m wide.

Disposition of types.—The holotype, allotype, and 10 paratypes (4 form I males and 6 females) collected with the holotype and allotype on 6 Nov 1983 are deposited at the Illinois Natural History Survey; 11 paratypes (USNM 209119; 5 form I males and 6 females) collected at the same time are deposited at the National Museum of Natural History, Smithsonian Institution. The morphotype and 18 paratypes (1 form I male, 12 form II males, and 5 females) collected at the type-locality with the morphotype on 17 May 1984 are deposited at the Illinois Natural History Survey; 10 paratypes (USNM 209120; all form II males) collected at the same time are deposited at the National Museum of Natural History, Smithsonian Institution.

Etymology.—Named in honor of Dr. Lewis J. Stannard, Entomologist Emeritus of the Illinois Natural History Survey, in recognition of his outstanding contributions to the study of Thysanoptera and to the conservation of natural habitats.

Range and specimens examined.—*Orconectes stannardi* has been found only in the Little Wabash River system of southeastern Illinois. Recent (since 1973) localities in addition to the type-locality (all Little Wabash River proper) are ½ mi N Louisville, Clay Co.; 1 mi E Clay City, Clay Co.; and 2 mi S Carmi, White Co.

Rietz (1912) and Brown (1955) recorded localities for *O. propinquus* and *O. indianensis* in the Little Wabash River system that almost certainly were based on misidentified *O. stannardi.* A recent survey of the crayfishes of Illinois (Page, in press) suggests that *O. propinquus, O. indianensis* and *O. stannardi* occur allopatrically, and that neither *O. propinquus* nor *O. indianensis* occurs in the Little Wabash River system. Unfortunately, the collections made by Rietz and Brown cannot be located and re-examined.

Although all collections of *O. stannardi* that have been made since 1973 are from the Little Wabash River proper, some of the collections of Rietz (1912) and Brown (1955) were from tributaries. Collections of Rietz (1912) were made in Big Muddy Creek between Richland and Clay counties, and in Skillet Fork at Wayne City, Wayne Co.; the former was identified by Rietz as *O. propinquus* and the latter as *O. indianensis.* Collections cited by Brown (all as *O. propinquus*) but which must have been of *O. stannardi* were made in Dismal Creek, 2¼ mi N Iola, Clay Co.; Salt Creek, 1 mi SE Effingham, Effingham Co.; Blue Point Creek, 2½ mi S Shumway, Effingham Co.; Lost Fork, 1½ mi E Omega, Marion Co.; branch of Little Wabash River, 1¼ mi SW Trowbridge, Shelby Co.; and Little Wabash River, 4 mi NE Shumway, Effingham Co.

Habitat.—Most individuals were found in shallow riffles composed of large flat stones. A few were found in deeper water but always in association with stones or accumulations of sticks and other debris. The preference of *O. stannardi* for rocky riffles is typical of the *propinquus* group of *Orconectes,* the members of which typically hide under stones and among debris.

Life-history notes.—All five collections of *O. stannardi* presently available (from Nov 1973, Nov 1983, and May 1984) contain form I males, and one (May 1984) contains two ovigerous females. All 20 males collected in November are form I; only one of 25 males collected in May is form I. The two ovigerous females

collected in May 1984 were 20.7 mm and 28.9 mm CL, and carried 124 and 184 eggs, respectively. Eggs average 1.9 mm in diameter.

Relationships.—*Orconectes stannardi* appears to be most closely related to *O. propinquus* from which it differs in having, on the first pleopod of the form I male, a caudal spur on the mesial process and a shoulder on the cephalic surface at the base of the central projection; a longer rostrum with margins less converging anteriorly and a less prominent carina; and a narrower areola. *Orconectes stannardi* is endemic, and possibly autochthonous, to the Little Wabash River system. The region drained by the Little Wabash was glaciated during the Illinoian (ca. 100,000 y.b.p.) but not the Wisconsinan (ca. 10,000 y.b.p.) advances, suggesting that the species originated sometime within the past 100,000 years. Fitzpatrick (1967) postulated that some speciation within the *O. propinquus* group was associated with the Wisconsin glaciation.

Recognized members of the *O. propinquus* group, as defined by Fitzpatrick (1967, 1968) and Fitzpatrick and Pickett (1980) are *O. propinquus, O. erichsonianus* (Faxon, 1898), *O. illinoiensis, O. jeffersoni* Rhoades, 1944, *O. sanborni* (Faxon, 1884) (including *O. s. erismorphorous* Hobbs and Fitzpatrick, 1962, *O. obscurus* Hagen, 1870, *O. virginiensis* Hobbs, 1951, *O. iowaensis* Fitzpatrick, 1968, and *O. kinderhookensis* Fitzpatrick and Pickett, 1980. *O. stannardi* can be added to this group, but *O. iowaensis* should be removed.

Fitzpatrick (1967, 1968) described *O. iowaensis* as endemic to Iowa and a sister species to *O. propinquus*. Features distinguishing *O. iowaensis* from *O. propinquus* were stated to be the truncate or spatulate mesial process of the first pleopod of the form I male and the more prominently sculptured annulus ventralis. The mesial process and annulus ventralis of *O. propinquus* were described, respectively, as tapering to an acute tip and being wider than long. *Orconectes iowaensis* was recognized by Hobbs (1972, 1974) and by Phillips and Reis (1979), who extended its known range into southern Minnesota. In his report on the crayfishes of Iowa, Phillips (1980) again recognized *O. iowaensis* but commented on the difficulty of separating *O. iowaensis* from *O. propinquus*.

In studying Illinois crayfishes, I have been obliged to search, in the northwestern part of the state, for populations assignable to *O. iowaensis* and to look for evidence of intergradation between *O. iowaensis* and *O. propinquus*. No population of *O. iowaensis* was found in Illinois and comparisons of Illinois samples of *O. propinquus* and *O. iowaensis* from the Maquoketa and Volga rivers, Iowa (including paratypes USNM 117970 and 117971), reveal that *O. iowaensis* does not differ from Illinois populations of *O. propinquus*; i.e., the mesial process of the first pleopod of form I male is not more truncate or spatulate, and the annulus ventralis is not narrower and more prominently sculptured. Inasmuch as Fitzpatrick (1967) noted the absence of "morphologically distinct geographic races" within *O. propinquus*, Illinois samples can be considered typical of the species. *O. iowaensis* is relegated to the synonymy of *O. propinquus*.

Acknowledgments

I am indebted to Kevin S. Cummings and Charles S. Swanson for assistance in collecting specimens, and to Horton H. Hobbs, Jr., John D. Unzicker, and Donald W. Webb for helpful comments on the manuscript.

Literature Cited

Brown, P. L. 1955. The biology of the crayfishes of central and southeastern Illinois. Doctoral Dissertation, University of Illinois. 158 pp.

———. 1956. A new crayfish of the genus *Orconectes* from Illinois (Decapoda, Astacidae).—American Midland Naturalist 56:163–167.

Faxon, W. 1884. Descriptions of new species of *Cambarus,* to which is added a synonymical list of the known species of *Cambarus* and *Astacus.*—Proceedings of the American Academy of Arts and Science 20:107–158.

———. 1898. Observations on the Astacidae in the United States National Museum and in the Museum of Comparative Zoology, with descriptions of new species.—Proceedings of the U.S. National Museum 20(1136):643–694.

Fitzpatrick, J. F., Jr. 1967. The Propinquus group of the crawfish genus *Orconectes* (Decapoda: Astacidae).—Ohio Journal of Science 67:129–172.

———. 1968. A new crawfish of the genus *Orconectes* from Iowa.—American Midland Naturalist 79:507–512.

———, and J. F. Pickett, Sr. 1980. A new crawfish of the genus *Orconectes* from eastern New York (Decapoda: Cambaridae).—Proceedings of the Biological Society of Washington 93:373–382.

Girard, C. 1852. A revision of the North American Astaci, with observations on their habits and geographical distribution.—Proceedings of the Academy of Natural Sciences of Philadelphia 6:87–91.

Hagen, H. A. 1870. Monograph of the North American Astacidae.—Illustrated Catalogue of the Museum of Comparative Zoology at Harvard College 3:1–109.

Hay, W. P. 1896. The crawfishes of the state of Indiana. Pages 475–507 *in* 20th Annual Report of the Department of Geology and Natural Resources of Indiana.

Hobbs, H. H., Jr. 1951. A new crayfish of the genus *Orconectes* from southeastern Virginia (Decapoda, Astacidae).—Virginia Journal of Science 2:122–128.

———. 1972. Crayfishes (Astacidae) of North and Middle America.—U.S. Environmental Protection Agency Biota of Freshwater Ecosystems Identification Manual 9:1–173.

———. 1974. A checklist of the North and Middle American crayfishes (Decapoda: Astacidae and Cambaridae).—Smithsonian Contributions to Zoology 166:1–161.

———, and J. F. Fitzpatrick, Jr. 1962. A new crayfish of the Propinquus group of the genus *Orconectes* from the Ohio drainage system in West Virginia (Decapoda, Astacidae).—Proceedings of the Biological Society of Washington 75:207–214.

Page, L. M. [In press.] The crayfishes and shrimps (Decapoda) of Illinois.—Illinois Natural History Survey Bulletin.

Phillips, G. S. 1980. The decapod crustaceans of Iowa.—Proceedings of the Iowa Academy of Science 87:81–95.

———, and L. A. Reis. 1979. Distribution and ecology of *Orconectes iowaensis* Fitzpatrick and *Orconectes rusticus* (Girard) in Minnesota.—Journal of the Minnesota Academy of Science 45: 18–19.

Rhoades, R. 1944. The crayfishes of Kentucky, with notes on variation, distribution, and descriptions of new species and subspecies.—American Midland Naturalist 31:111—149.

Rietz, N. M. 1912. Ecological relations of the crawfishes of Illinois.—B.S. Thesis, University of Illinois, 86 pp.

Illinois Natural History Survey, 607 E. Peabody Drive, Champaign, Illinois 61820.